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A New Mammoth, "Elephas Hayi," from Crete, Nebraska

E. H. Barbour
University of Nebraska - Lincoln

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BY

ERWIN H. BARBOUR

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A NEW MAMMOTH, ELEPHAS HAYI, FROM CRETE, NEBRASKA

BY ERWIN H. BARBOUR

On June 23, 1914, the office of the Nebraska Geological Survey was notified that a mammoth jaw had been discovered in the Hurlbert sand pit at Crete, Nebraska, eight blocks east and three blocks north of the center of the town.

An assistant in the department was detailed to visit the spot at once, and through the courtesy of Mr. Hurlbert, secured the mandible and teeth of a mamoth that proved to be new. We wish to propose for this the name Elephas hayi in recognition of Dr. Oliver P. Hay, of the Carnegie Institute, who has spent some time in the study of the specimen, and who concurs in the belief that it is new.

The jaw, though finely preserved, was badly broken and damaged in the pit, and although pieces were carried away as relics, they were afterwards returned. Later the surrounding gravel was carefully screened and important additional bits were obtained. The writer also visited the site of the discovery, and finds the sands and gravels to be of considerable extent, and of glacial origin. They undoubtedly represent an interglacial, rather than a glacial stage, and shall be counted Aftonian. The deposit seems to vary in thickness from 10 to 20 feet or more, and probably contains numerous bones. The specimen in question was found 11 feet below the surface. It is reported that a number of years ago, many bones were found extending from the present Hurlbert gravel pit across the newly graded road, particularly in an excavation for the basement of a neighboring building. This leads to the hope that as work progresses additional material may be found.

Associated with this jaw were fragments of a large tusk. The jaw and teeth of an exceptionally large and interesting new Pleistocene horse were found two blocks distant in the same deposit.

The chief distinguishing characters of Elephas hayi are: unusual length of mandible; the last molar small, narrow, and anterior to the coronoid; transverse ridges 10 to 11; angle distinct and sharp posteriorly; coronoids uncommonly prominent, deeply pitted, and set very obliquely. Making allowance for sex, age, and individual variation, the mandible of Elephas hayi, as compared with any of our well-known

mammoths—E. imperator, E. columbi, or E. primigenius—is uncommonly long, justifying the name long-jawed mammoth. The jaw may be counted a primitive character, for longirostral proboscideans preceded the more modern brevirostral forms. In modern elephants and mammoths, the inferior mandibular border is broad and round, and curves without angle into the ascending ramus. Though much the same in E. hayi, it is to be noted that the inferior border is somewhat subangular, and that there is a distinct angle which is compressed to a narrow edge posteriorly. This is quite unlike ordinary forms of the genus Elephas.

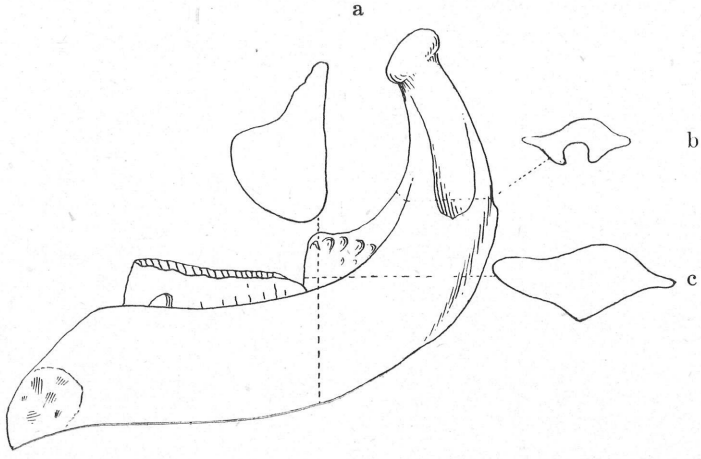

FIG. 1.—Elephas hayi. a, vertical section through coronoid; b, horizontal section near rim of inferior dental foramen; c, horizontal section through coronoid and angle.

The mandible of E. hayi measures 29½ inches (750 mm.) from the tip of the symphysis to the angle, while the mandible of E. imperator, shown in figures 2 and 4, measure 21½ inches (546 mm.), the difference being 8 inches (203 mm.). The depth of the jaw at the coronoids is 9½ inches (241 mm.), that of E. imperator 10½ (267 mm.). Though noticeably longer, the jaw of the Crete mammoth is thinner than that of E. imperator. The accompanying sections will give an idea of form, and will show certain fundamental differences.

The coronoid process is conspicuously robust, being 2¾ inches (70 mm.) through near its base, and an inch (25 mm.) near the summit. It stands 4 inches (102 mm.) above the superior mandibular border, and 2 inches (51 mm.) above the crown of the teeth. It is

set more obliquely than in other mammoths. Its inner surface is deeply pitted, and extends from the outer to the inner alveolar border. The coronoids of mammoths and modern elephants are weak and thin as compared with those of E. hayi.

The distinguishing character on which this new mammoth must depend is derived, first of all, from the teeth. Especial care was exercised to determine whether the teeth in the jaw of E. hayi are penultimate or ultimate molars. If penultimate, a successor should be in evidence in each ramus, but not a fragment of a tooth or plate could be found in the cavities, which were filled with compact sand and gravel; nor could any such fragments be found in the surround-

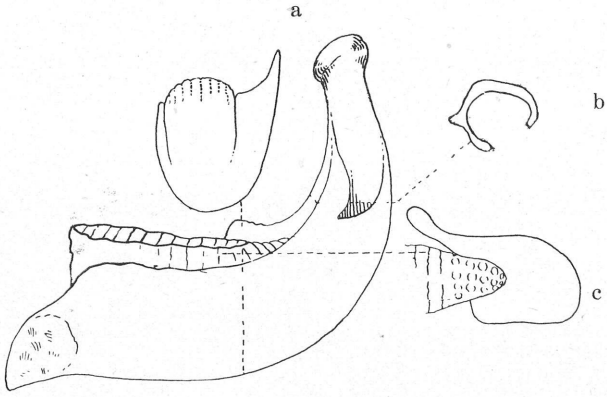

FIG. 2.—Elephas imperator. a, vertical section through coronoid and sixth molar; b, horizontal section near rim of inferior dental foramen; c, horizontal section through base of coronoid and last molar. For comparison with Elephas hayi.

ing gravels when screened. Undoubtedly the two teeth are the sixth molars, a point of consequence in this connection.

The teeth are those of a mature individual, with crowns well worn. Though well cemented and strong, the teeth of E. hayi are noticeably small. The postero-anterior diameter is but 9 inches (229 mm.), and the greatest transverse diameter 3 inches (76 mm.). A similar tooth of E. imperator, shown in figures 2 and 4, exceeds 14 (356 mm.) by 4 inches (102 mm.). The dimensions of these teeth agree more closely with those of our earlier Nebraska mastodons than with those of our mammoths. The number of transverse plates is noticeably reduced, for there are but 10 in one tooth, and 11 in the other, with no plates

missing. In E. imperator, there are 16 to 18 very thick plates; in E. columbi, 24 to 26, and even 28 moderately thick plates; and in E. primigenius, 18 to 27 thin plates, although fewer than 24 is rare. Ten enamel plates to the decimeter generally indicates E. primigenius, 6 to 8 E. columbi, and 5 to 6 E. imperator. In E. hayi, there are 4 and a fraction transverse enamel ridges to the decimeter. The valleys are deep and bordered by highly crenulated enamel ridges. The great anterior prong branches widely and carries 3 plates. The teeth lack

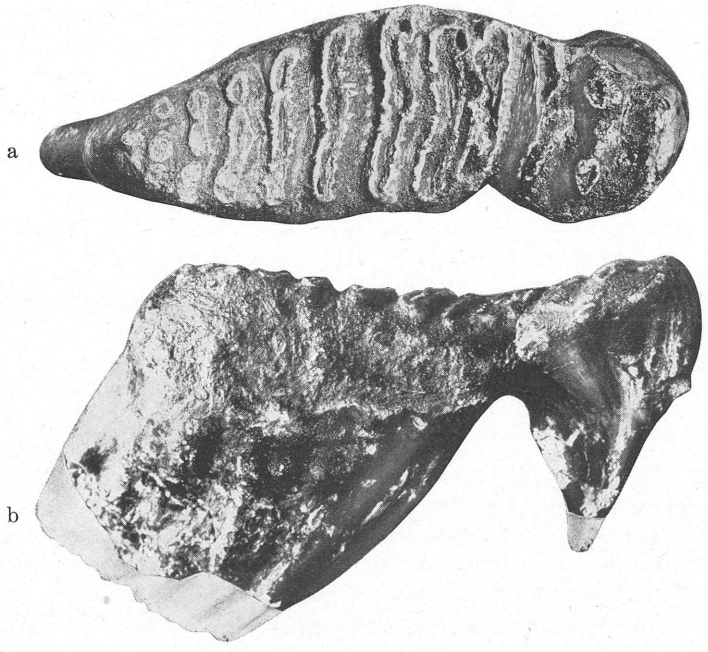

FIG. 3.—Elephas hayi. Last lower right molar. a, crown view; b, side view, x ⅓.

the symmetrical development common to mammoths. They are noticeably constricted back of the anterior prong, and taper posteriorly to 1½ inches (38 mm.).

Ancestral proboscideans began with 2 simple transverse ridges to each molar tooth. Later forms, such as the mastodons, had 3, 4, and 5 or more; intermediate forms, such as stegodonts, had 6 to 8 or more; while mammoths had many. In E. hayi, there are but 11 transverse ridges at most, the last being small, perhaps a heel. This form

seems to be an earlier and more primitive type of mammoth than any other known to the State.

The inferior dental foramen is small, and has a circular border, while in E. imperator it is very large and deeply notched, as shown in the accompanying figures. Although inferior dental foramina differ in

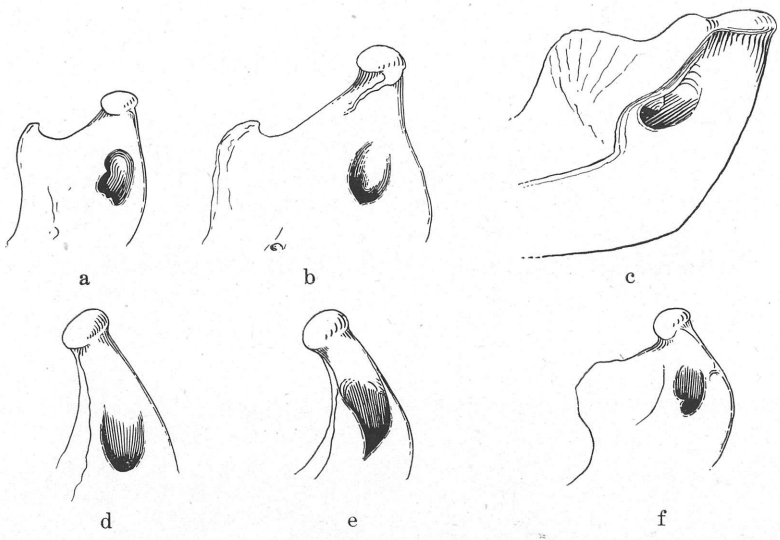

FIG. 4.—Ascending rami and inferior dental foramina of certain Nebraska Proboscidea. a, Tetrabelodon willistoni; b, Tetrabelodon lulli; c, Eubelodon morrilli; d, Elephas hayi; e, Elephas imperator; f, Elephas indicus. From specimens in the collection of Hon. Charles H. Morrill, the Nebraska State Museum.

individuals, and even between opposite sides of the jaw, the differences shown by the cuts are significant. The ascending rami of our proboscideans also vary between wide limits. Judging by the large number of varied Nebraska Proboscidea, multiplication of generic and specific names in this group seems inevitable.

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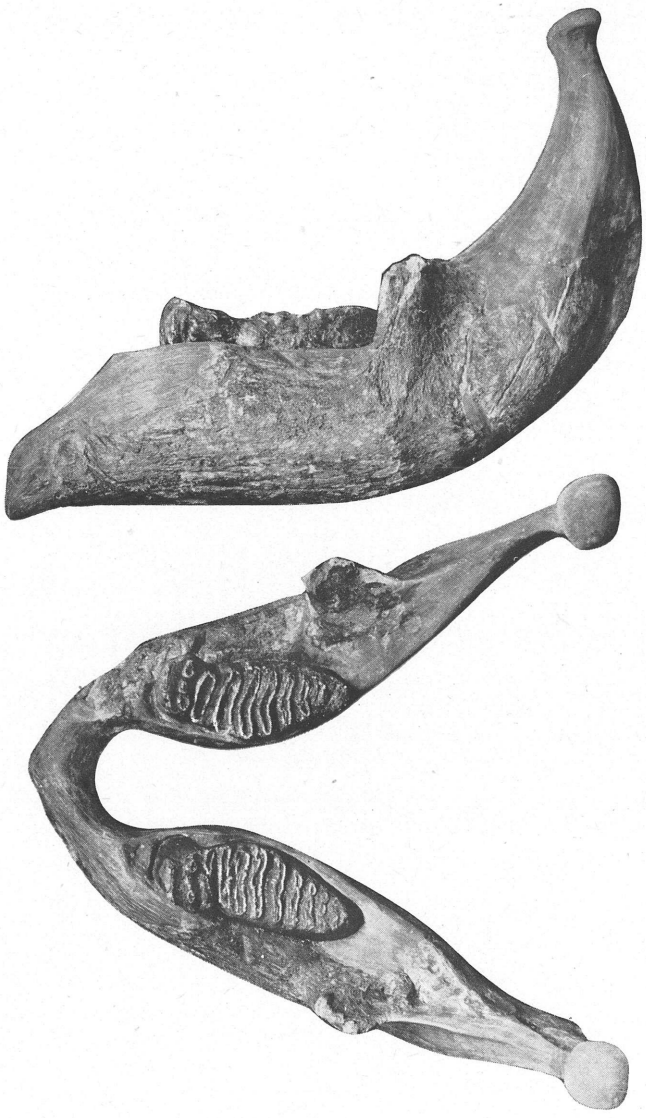
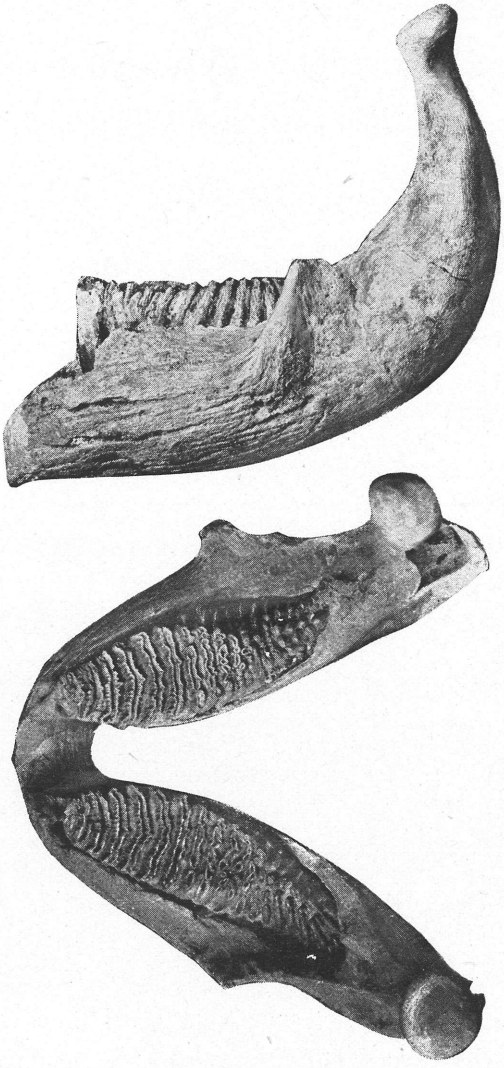


ELEPHAS HAYI, sp. nov. ×1/8.

Aftonian. Crete, Nebraska. Collections of Hon. Charles H. Morrill, the Nebraska State Museum.



ELEPHAS IMPERATOR, × 1/8.

Sutton, Nebraska. Collections of Hon. Charles H. Morrill, the Nebraska State Museum.